

Abstract Submitted
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Ion heating and characteristics of ST plasma used by double-pulsing CHI on HIST TAKAFUMI HANAO, HIDETOSHI HIRONO, TAKAHIRO HYOBU, KENGO ITO, KEISUKE MATSUMOTO, TAKASHI NAKAYAMA, NOBUHARU OKI, YUSUKE KIKUCHI, NAOYUKI FUKUMOTO, MASAYOSHI NAGATA, University of Hyogo — Multi-pulsing Coaxial Helicity Injection (M-CHI) is an efficient current drive and sustainment method used in spheromak and spherical torus (ST). We have observed plasma current/flux amplification by double pulsing CHI. Poloidal ion temperature measured by Ion Doppler Spectrometer (IDS) has a peak at plasma core region. In this region, radial electric field has a negative peak. At more inboard side that is called separatrix between closed flux region and inner open flux region, poloidal flow has a large shear and radial electric field changes the polarity. After the second CHI pulse, we observed sharp and rapid ion heating at plasma core region and separatrix. In this region, the poloidal ion temperature is selective heating because electron temperature is almost uniform. At this time, flow shear become larger and radial electric field is amplified at separatorix. These effects produce direct heating of ion through the viscous flow damping. Furthermore, we observed decrease of electron density at separatrix. Decreased density makes Hall dynamo electric field as two-fluid effect. When the ion temperature is increasing, dynamo electric field is observed at separatrix. It may have influence with the ion heating. We will discuss characteristic of double pulsing CHI driven ST plasmas and correlation of direct heating of ion with dynamo electric field and any other parameters.

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